

CLAIMS

The subject matter claimed is:

1. A method for genetically stabilizing an apomictic plant exhibiting genetic instability comprising producing through chromosome doubling or B_{11} hybridization a polyploid derivative line from said plant such that duplicate genes responsible for apomixis are isolated from each other on opposite homeologous genomes such that recombination is suppressed among homeologous genomes within the polyploid derivative line.

2. A method for genetically stabilizing an apomictic plant exhibiting genetic instability comprising:

(a) producing through chromosome doubling or B_{11} hybridization a polyploid derivative line from said plant such that duplicate genes responsible for apomixis are isolated from each other by segmental allopolyploidy; and

(b) increasing fertility of said apomictic segmental allopolyploid by selfing or hybridizing with a similar plant to obtain sexually-derived progeny that express, because of fortuitous recombinations, greater pollen fertility, unreduced egg fertility, or parthenogenesis.

3. A method for genetically stabilizing an apomictic plant exhibiting genetic instability comprising producing through mutation or other plant stresses a derivative line of said plant that contains one or more chromosomal aberrations that isolate the duplicate genes responsible for apomixis from recombination during meiosis in the derivative line.

4. A method for genetically stabilizing an apomictic plant exhibiting genetic instability comprising transforming said plant with a recombinant DNA characterized by a promoter/gene construct that causes female meiosis to abort.

5. A method for genetically improving plants comprising:

(a) producing an apomictic plant, determining if said apomictic plant is genetically stable, and if said apomictic plant is unstable, then genetically stabilizing it to result in a genetically-stabilized derivative line;

(b) genetically enhancing said apomictic plant or genetically-stabilized derivative line, either of which is a facultative apomict, through plant breeding procedures where

genetically divergent sexual or apomictic lines are hybridized with said apomictic plant or genetically-stabilized derivative line or through genetic engineering procedures using transgenic constructs;

5 (c) breeding or transforming said plant, genetically-stabilized derivative line, or genetically-enhanced derivative line to include genetic material such that:

10 (i) female meiosis aborts resulting in essentially 100% apomictic seed formation except in the optional case of an inducible down regulation of a transgenic promoter/gene construct, which gene construct causes meiotic abortion when expressed, such that facultative apomixis is expressed; or

15 (ii) facultative apomixis occurs except during an inducible up regulation of a transgenic promoter/gene construct that when expressed causes meiotic abortion resulting in essentially 100% apomictic seed formation.

6. A method for controlling facultativeness of apomixis in an apomictic plant comprising transforming said apomictic plant with an antisense nucleic acid corresponding to a selected quantitative trait locus such that high frequency sexual seed formation occurs.

20 7. A method for controlling facultativeness of apomixis in a facultative apomictic plant comprising transforming said facultative apomictic plant with an antisense nucleic acid corresponding to a selected quantitative trait locus such that obligate to near obligate apomixis occurs.